SPECIAL REPORT

A Practical Guide to the American Community Survey (3-Year Estimates)

TOM REX is associate director of the Center for Competitiveness and Prosperity Research in the W. P. Carey School of Business at Arizona State University. Rex specializes in applied economic and demographic research with an emphasis on Arizona and the Metropolitan Phoenix area.

Historically, most demographic data were obtained from the long version of the decennial census survey—that is, a "snapshot" of the characteristics of the population was available once every 10 years. The long form of the decennial census has been replaced by the American Community Survey that has been conducted on an ongoing basis for the entire country since 2005. Instead of a snapshot in which all of the data are gathered at one time, the ACS aggregates data over time, making the results more difficult to interpret. However, the ACS data are updated annually.

ACS results are released annually for areas with a population of at least 65,000; data are currently available for each year from 2005 through 2008. (However, people living in group quarters such as prisons and nursing homes were not surveyed in 2005.) Combined results for three years of data are available for areas with a population of at least 20,000; data are available for 2005 through 2007 and for 2006 through 2008. Combined results for five years of data are not yet available, but the 2005 through 2009 data are scheduled for release in late 2010. This release will include figures for areas with a population of less than 20,000.

The Census Bureau has staggered the release of ACS data by population size because of the substantial sampling error. Even the combined data for five years will have larger sampling error than was present from the long form of the decennial census.

Just because the Census Bureau releases some of the ACS data does not mean that the sampling error is small enough to be of little consequence. In fact, the opposite is true: most of the data released have sampling error that is too large to make the data usable for most purposes.

The Census Bureau provides the sampling error in the form of the margin of error, which is published with every estimate. The Census Bureau calculates the margin of error at the 90 percent confidence level. The following is an example:

The estimate of the poverty rate in Maricopa County in 2008 is 13.4 percent, with a margin of error of + or – 0.6 percentage points. The interpretation is that there is a 90 percent likelihood that the actual poverty rate is within the confidence interval of 12.8 percent to 14.0 percent. A one-in-ten chance exists that the real rate is outside this range.

Most surveys, such as public opinion polls, express error at 95 percent confidence. This widens the confidence interval (in the above example it becomes + or – 0.7 percentage points), but reduces the chances that the actual figure is outside the confidence interval to only one in 20.

If the purpose of obtaining the poverty rate for Maricopa County is simply to get a rough idea of its value, then the stated margin of error may not be a significant issue. However, if the goal is to compare the poverty rate in 2008 to that in 2007, or to compare the rate to other geographic areas, then a margin of error of this magnitude becomes a prohibitive problem. It is impossible to state with any confidence that the reported 13.4 percent poverty rate is higher or lower than the county's reported 13.1 percent of the prior year or, for example, whether it is higher or lower than the national average of 13.2 percent.

For those interested in a time series of data—that is, how a value changes from year to year—then a rough rule of thumb is that a margin of error that is as large or larger than the likely annual change in the value is too large to be useful. For example, the percentage of the population age 25 or older who has earned a graduate degree (such as a master's degree or doctorate) changes little

ARIZONA INDICATORS

SPECIAL REPORT
VOLUME 1 / ISSUE 1
FEBRUARY 2010
arizonaindicators.org

Arizona Indicators is an online information resource and analysis tool that centralizes data about the state and its communities. Arizona Indicators presents interactive visualizations, clear data descriptions, and public opinion data in a broad range of content areas.

This project is made possible by generous support from the Arizona Community Foundation and Arizona State University.

For more information, contact Andrea Whitsett at (602) 496-0217 or andrea.whitsett@asu.edu.

Arizona Indicators is a project of Morrison Institute for Public Policy.

411 N Central Ave
Suite 900
Phoenix, Arizona
85004-0692
(602) 496-0900 Main
(602) 496-0964 Fax
MorrisonInstitute.asu.edu

ASU Morrison Institute for Public Policy
ARIZONA STATE UNIVERSITY

from year to year. It has gradually been climbing nationally and in Arizona by an average of between 0.1 and 0.2 percentage points a year. The increase is due to younger adults earning a graduate degree and to the deaths of elderly persons—advanced degrees in this age cohort were rare. The migration of people into and out of an area also can affect the value, but such migration rarely has more than a minor effect in any year.

The following table presents the ACS estimates, and margins of error, of the percentage of the population age 25 or older who have earned a graduate degree. For estimates specific to a single year, the margin of error is small for the most populous areas, such as the nation and regions. The margin of error is higher than desirable for Arizona and becomes prohibitively large for areas of less than a few million people.

The volatility of the annual estimates increases with decreasing population size. Even for Maricopa County, annual ups and downs can be seen. The 2007 estimate for Coconino County appears to be one of the one-in-ten chances that the actual value is not within the confidence interval. Even for Pima County, the results are unclear: is the value closer to 12.2 percent, which apparently is similar to the value for Coconino County, or is it closer to 11.5 percent?

Sampling error is smaller when three years of data are combined, but still is too large for users to have much confidence in the results for areas less populous than Maricopa County. The sampling error will be smaller when five years of data become available, but will remain a significant issue for less populous areas. If an estimate for one year is far enough off the mark, as appears to be the case in Coconino County in 2007, then a three-year estimate (or even a five-year estimate) could be substantially different from the actual value.

While overall population size is a good first indicator of sampling error, the magnitude of the error also depends on the size of the subset of the population being analyzed. For example, the estimate of the total female population is much more accurate than the estimate of 15-year-old females of Asian race. The following practical guidelines were derived from the analysis of several demographic indicators from the ACS, but need to be adjusted for the size of the population subset of interest:

- Do not use single-year data for areas with a population of less than 5 million; be cautious when using the data for areas of between 5 and 10 million.
- Do not use three-year averages for areas with a population of less than 2.5 million; be cautious when using the data for areas of between 2.5 and 5 million.

For more information on the accuracy of the ACS, see http://www.census.gov/acs/www/UseData/Accuracy/Accuracy1.htm.

Percentage of the Population Age 25 or Older With a Graduate Degree

	United States	Western Region	Arizona	Maricopa County	Pima County	Coconino County
2005	10.0%	10.2%	9.3%	9.5%	12.2%	12.3%
2006	9.9	10.1	9.2	9.8	11.4	12.4
2007	10.1	10.3	9.2	9.5	12.2	16.1
2008	10.2	10.4	9.2	9.7	11.7	11.9
Margin of Error, 2008	+/-0.1	+/-0.1	+/-0.2	+/-0.3	+/-0.7	+/-2.1
2005-07	9.9	10.1	9.2	9.5	11.8	13.6
2006-08	10.1	10.3	9.2	9.7	11.6	13.5
Margin of Error, 2006-08	+/-0.1	+/-0.1	+/-0.1	+/-0.2	+/-0.4	+/-1.1
Population in millions (2008)	304	71	6.5	3.9	1.0	0.13

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, extracted with American FactFinder (Data Profiles)